



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/697,996

10/30/2003

Mark Own Homewood

S1022.81044US00

7394

23628 7590 12/15/2008
WOLF GREENFIELD & SACKS, P.C.
600 ATLANTIC AVENUE
BOSTON, MA 02210-2206

EXAMINER

HASSAN, AURANGZEB

ART UNIT

PAPER NUMBER

2182

MAIL DATE

DELIVERY MODE

12/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/697,996	HOMEWOOD ET AL.	
	Examiner	Art Unit	
	AURANGZEB HASSAN	2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/30/2008 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 3 – 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis et al (U.S. Patent No. 5,797,043 hereinafter “Lewis”) in view of George et al. (US Patent Number 6,785,829, hereinafter “George”) further in view of Lai et al. (US Patent Number 6,549,964 hereinafter “Lai”).**

4. As to Claims 1 and 24, Lewis teaches a system comprising:

a processor comprising an execution for executing instructions; (Host Processor, element 12, figure 1a)

a stream register unit configured to supply a first type of data to the execution unit, the first type of data being data supplied from a peripheral (I/O Channel Controller, element 62, figure 3, element 140, figure 5a), the stream register unit including at least one stream register unit FIFO configured to store the first type of data received from the peripheral (FIFO pool 172, figure 5a);

a FIFO coupled to the peripheral to receive said first type of data from the peripheral (column 14, lines 25 – 29) and connected to the stream register unit by a communication path (FIFO Pool Bus 144, figures 5a and 6), along which said first type of data can be supplied from the FIFO to the at least one stream register unit FIFO (FIFO pool subsystem, figure 6, FIFO memory is connected via FIFO pool bus 144 as can be seen in figures 5a and 6); and

a memory bus, separate from the communication path, connected between a data memory and the processor, across which the processor can access the second type of data, the second type of data being randomly accessible data held in the data memory (Processor Bus, element 16', figure 2);

wherein the first type of data is supplied via the communication path directly from the FIFO coupled to the peripheral to the stream register unit of the processor (FIFO pool subsystem, figure 6, FIFO memory is connected via FIFO pool bus 144 as can be seen in figures 5a and 6) and the second type of data is supplied via the memory bus,

separate from the communication path, between the data memory and the processor (Processor Bus, element 16', figure 2).

Lewis fails to teach a system wherein a stream register unit being part of the processor.

George teaches, in an analogous system, a system wherein the stream register unit (cache, element 365, figure 3) forms part of the processor (processor, element 300, figure 3).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system of Lewis with the above teachings of George. One of ordinary skill in the art at the time of the applicant's invention would have been motivated to make such modifications in order to efficiently optimize a system with regards to real estate in compactness and means of high-speed processing.

The combination of Lewis and George fails to teach system wherein the stream register unit is arranged to, if the signal sent by the FIFO is the said different signal indicating that the data is not available, send a stall signal to the processor, causing the processor to stop executing instructions.

Lai teaches a system, wherein the stream register unit is configured to, when the FIFO coupled to the peripheral provides, in response to a request for data from the stream register unit, an indication that the data is not available (first defer identifier, column 3, lines 16 – 20), send a stall signal to the execution unit, causing the execution unit to stop executing instructions (issue a stop signal, column 3, lines 20 - 26).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the combination of Lewis and George with the above teachings of Lai. One of ordinary skill in the art at the time of the applicant's invention would have been motivated to make such modifications in order to handle multiple delayed transactions in a system.

5. As to claim 3, Lewis teaches a system, wherein data is supplied from the FIFO to the stream register unit accordance with requests for data made (requested function, column 13, 23 – 30) by the processor to the stream register unit and forwarded to the FIFO (FIFO pool buffering functions, column 12, lines 38 –58).

6. As to claim 4, Lewis teaches a system, wherein the said requests are made as accesses to volatile variables (10 Bit – Request variable changes consistently per requested lines of data and can be changed at any time, Table VIII).

7. As to claim 5, Lewis teaches a system wherein the FIFO is arranged to, upon receiving a request for data from the stream register unit, send a signal to the stream register unit indication availability of the requested data (available space and data, Table VII sent via BTU, element 170 figure 5b.).

8. As to claim 6, Lewis teaches a system, wherein if the FIFO contains the requested data, the said signal to the stream register unit indicates that the data is

available, and the FIFO is further arranged to send (burst data transfer, column 20, lines 1 – 4) a signal (transfer signals, Table VI) to the stream register unit comprising the data (column 19, lines 64 – 67, column 20, lines 1 – 35).

9. As to claim 7, Lewis teaches a system, wherein the stream register unit is arranged to, following receipt of the signal comprising the data, supply the data (data stream, element 76, figure 3) to the execution unit (column 10, lines 25 – 41, passed to DSP, column 20 lines 5 - 35).

10. As to claim 8, Lewis teaches a system, wherein the stream register unit is arranged to, following receipt of the signal comprising the data, send a signal to the FIFO indicating that it has taken the data (Transfer Done, Table VII).

11. As to claim 9, Lewis teaches a system, wherein the said signal to the FIFO further indicates the next location in the FIFO from which the data is required (next sequential, column 16, lines 10 – 33).

12. As to claim 10, Lewis teaches a system comprising a FIFO connected to receive data from the peripheral and connected to the stream register unit.

The combination of Lewis and George fails to teach system wherein the FIFO is further arranged to, if it does not contain the requested data, send a different signal to the stream register unit indicating that the data is not available.

Lai teaches a system, wherein the FIFO is further arranged to, if it does not contain the requested data, send a different signal to the stream register unit indicating that the data is not available (first defer identifier, column 3, lines 16 – 20).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the combination of Lewis and George with the above teachings of Lai. One of ordinary skill in the art at the time of the applicant's invention would have been motivated to make such modifications in order to optimize a request process in which resources are valuable and delays need to be minimized, improving processor to device throughput.

13. As to claim 11, Lewis teaches a system comprising a FIFO connected to receive data from the peripheral and connected to the stream register unit.

The combination of Lewis and George fails to teach system wherein the stream register unit is arranged to, if the signal sent by the FIFO is the said different signal indicating that the data is not available, send a stall signal to the processor, causing the processor to stop executing instructions.

Lai teaches a system, wherein the stream register unit is arranged to, if the signal sent by the FIFO is the said different signal indicating that the data is not available, send a stall signal to the execution unit, causing the processor to stop executing instructions (issue a stop signal, column 3, lines 20 - 26).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the combination of Lewis and George with the above

teachings of Lai. One of ordinary skill in the art at the time of the applicant's invention would have been motivated to make such modifications in order to handle multiple delayed transactions in a system.

14. As to claim 12, Lewis teaches a system comprising a FIFO connected to receive data from the peripheral and connected to the stream register unit.

The combination of Lewis and George fails to teach system wherein the FIFO is further arranged to, if following sending of the said different signal to the stream register unit indicating that the data is available and to send a signal comprising the data to the stream register unit.

Lai teaches a system, wherein the FIFO is further arranged to, if following sending of the said different signal to the stream register unit indicating that the data is available and to send a signal comprising the data to the stream register unit (when the initiator is ready, data transfer between the initiator and the responder begins, column 3, lines 32 – 34).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the combination of Lewis and George with the above teachings of Lai. One of ordinary skill in the art at the time of the applicant's invention would have been motivated to make such modifications in order to handle multiple delayed transactions in a system requesting data.

Art Unit: 2182

15. As to claims 13 and 25, Lewis teaches a system, further comprising a timeout generator, arranged for communication with the processor and the stream register unit, and arranged to, if the signal sent by the FIFO is a signal indicating that the data is not available (data available in the FIFO, Table VIII), after a predetermined period of time, send a timeout signal to the execution unit, causing the processor to interrupt (Interrupt, Table III & XXIV) such that it can execute other instructions (column 36, lines 1 – 17).

16. As to claim 14, Lewis teaches a system, wherein if following sending of the timeout signal to the execution unit the data subsequently becomes available, the timeout generator is arranged to receive a signal instructing it to cease sending the timeout signal, and to, upon receipt of the said instruction, cease sending the timeout signal (column 36, lines 18 – 40).

17. As to claim 15, Lewis teaches a system, wherein the stream register unit is arranged to, if following sending of the timeout signal to the execution unit the data subsequently becomes available, send the data to the execution unit (in response to host interrupts, the host processor provides for the transfer of data, column 26, lines 25 – 34).

18. As to claim 16, Lewis teaches a system, wherein the stream register unit is associated with a register file containing a plurality of registers (register based interface,

Art Unit: 2182

column 22, lines 15 – 33) and a load/store unit arranged to receive data from the stream register unit and temporarily store the data in the register file (column 19, lines 52 – 63).

19. As to claim 17, Lewis teaches a system, wherein the execution unit is arranged to retrieve data from the register file (column 22, lines 15 – 33).

20. As to claim 18, Lewis teaches a system, wherein data is supplied from the FIFO to the stream register unit in accordance with requests for data made by the processor to the stream register unit and forwarded to the FIFO (figure 1a and 1b), wherein the stream register unit is associated with a register file containing a plurality of registers and a load/store unit arranged to receive data from the stream register unit and temporarily store the data in the register file (column 19, lines 52 – 63), wherein the execution unit is further arranged to make requests for data to the stream register unit via the load/store unit (column 33, lines 33 – 39).

21. As to claim 19, Lewis teaches a system, wherein the stream register unit comprises one or more FIFOs connected to receive data from the FIFO connected to the stream register unit and supply the data to the execution unit (FIFO 0 – 3, elements 210 – 212, figure 5c).

22. As to claim 20, Lewis teaches a system, wherein the request for data is a request for a single data item (column 10, lines 30 - 41).

23. As to claim 21, Lewis teaches a system, further comprising one or more additional FIFOs linked (FIFO 0 – 3, elements 210 – 212, figure 5c) together between the said FIFO and the communication channel (FIFO pool subsystem, figure 6).

24. As to claim 22, Lewis teaches a system, wherein the data from the peripheral is video data (video words, column 25, lines 37 – 40).

25. As to claim 23, Lewis teaches a system, wherein the peripheral is a video processing system (video controller, column 25, lines 29 – 48).

26. Claim 26 – 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis in view of Garcia et al. (US Patent Number 6,433,785 hereinafter “Garcia”).

27. As per claims 26 and 30, Lewis teaches a stream register being part of a processor comprising an execution unit, the stream register being connectable between the execution unit and peripheral and between the execution unit and a memory, comprising:

a receiver arranged to receive a request for a data item from the execution unit (column 10, lines 30 - 41); at least one FIFO configured to store the data item received from the peripheral (FIFO pool 172, figure 5a); and

a stream engine (element 76, figure 3), arranged to send the request to the peripheral and receive one or more signals back from the peripheral indicating availability of the requested data item (I/O Channel Controller, element 62, figure 3), and, when the data item is available (available space and data, Table VII sent via BTU, element 170 figure 5b.), send the data item to the execution unit of the processor.

Lewis fails to teach a register wherein when the data item being requested is not available, sending a timeout signal to the processor.

Garcia teaches a register wherein when the data item being requested is not available, sending a timeout signal to the execution unit of the processor (timeout counter, column 5, lines 26 – 42)

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system of Lewis with the above teachings of Garcia. One of ordinary skill in the art at the time of the applicant's invention would have been motivated to make such modifications in order to optimize a request process in which resources are valuable and delays need to be minimized, improving processor to device throughput.

28. As to claim 27, Lewis teaches a stream register, wherein the stream engine is arranged to send the timeout signal to the execution unit of the processor after a predetermined period of time (Interrupt, table III).

Art Unit: 2182

29. As to claim 28, Lewis teaches a stream register, wherein the stream engine is further arranged to, when the data is available, temporarily store the data in a register file for access by the execution unit of the processor (temporarily stored in a FIFO within the bus master units, column 19, lines 52 – 63).

30. Lewis modified by the teachings of Garcia as applied to claims 26 and 30 above, in regards to claim 29, Lewis teaches a stream register, wherein the stream engine is further arranged to temporarily store (column 19, lines 52 – 63) the data in a register file for access by the execution unit (column 18, lines 29 – 36).

Lewis fails to teach a stream register, wherein the stream engine is further arranged to, following sending of the timeout signal to the execution unit of the processor, when the data item subsequently becomes available, receive a signal instructing it to cease sending the timeout signal, and to upon receipt of the said instruction cease sending the timeout signal to the processor.

Garcia teaches a stream register, wherein the stream engine is further arranged to, following sending of the timeout signal to the processor, when the data item subsequently becomes available (posted write buffer available signal 350, column 5, lines 30 – 31), receive a signal instructing it to cease sending the timeout signal, and to upon receipt of the said instruction cease sending the timeout signal to the processor (column 5, lines 26 – 42).

Response to Arguments

31. Applicant's arguments filed 9/30/2008 have been fully considered but they are not persuasive. The Applicant argues that the newly amended claim limitations are not taught by Lewis and George and secondly that Lai does not teach a stall signal that stops a transaction when data is not available. Lastly that the timeout signal of Garcia is not the same as the claimed invention.

With respect to applicant's arguments regarding Lewis and George, the Examiner respectfully disagrees. The newly added limitations are based on claims 10 - 12 which were relied upon by Lai. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Examiner relied upon Lai for teachings of a stall signal.

In response to applicant's argument that the STOP signal of Lai is only utilized for stopping a transaction after completion, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

While the Applicant is responsible for all teachings germane to Lai, the examiner notes that Lai is relied upon for the teachings of using a STOP signal when data is unavailable. Other teachings of the STOP signal were not cited by the Examiner. Clearly from the cited passages in column 3, lines 16 - 26 one of ordinary skill in the art

can recognize that Lai sends a signal that causes a stop in execution when data is not available.

With regards to Garcia not teaching a timeout signal the Examiner respectfully disagrees. The applicant has elaborated on alternate embodiments of Garcia to show that the timeout signal may vary from that of instant application how explicitly pointing out differences in the specification without have such characteristics necessitated by the claims does not overcome the rejection. The claims necessitate a timeout signal that allows other applications to execute. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Conclusion

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to AURANGZEB HASSAN whose telephone number is (571)272-8625. The examiner can normally be reached on Monday - Friday 9 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq Hafiz can be reached on (571)272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2182

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AH

/Ilwoo Park/
Primary Examiner, Art Unit 2182
December 8, 2008